***Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.***

WAYNE®

# Jet Pump Water Systems

## Description

Shallow well jet pumps are single stage domestic water pumps designed for pumping portable water in applications where the water is located less than 25 feet vertically from the pump. A pressure switch is a standard feature. The shallow well pump can be mounted to either a precharged, conventional type or free standing pressure tank.

### Unpacking

After unpacking the jet pump, carefully inspect for any damage that may have occurred during transit. Check for loose, missing or damaged parts.

## Safety Guidelines

This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols.

**⚠DANGER** ***Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.***

**⚠WARNING** ***Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.***

**⚠CAUTION** ***Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.***

**NOTICE** ***Notice indicates important information, that if not followed, may cause damage to equipment.***

## General Safety Information

1. Read the instruction manual included with the product carefully. Be thoroughly familiar with the controls and the proper use of the equipment.
2. Know the pump application, limitations and potential hazards.

**⚠WARNING** ***Always install a pressure relief valve to match the system pressure rating and the maximum flow rate.***

**⚠WARNING** ***Do not use to pump flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc. Do not use in explosive atmospheres. Pump should only be used with liquids compatible with pump component materials. Failure to follow this warning can result in personal injury and/or property damage.***

**⚠WARNING** ***Disconnect power and release all pressure from the system before attempting to install, service, relocate or perform any maintenance. Lock the power disconnect in the open position. Tag the power disconnect to prevent unexpected application of power.***

**⚠WARNING** ***Install a screen around the inlet pipe to prevent entrapment of swimmers.***

3. Drain all liquids from the system before servicing.
4. Secure the discharge line before starting the pump. An unsecured discharge line will whip and possibly cause personal injury and/or property damage.
5. Check hoses for weak or worn condition before each use. Make certain all connections are secure.
6. Periodically inspect pump and system components. Perform routine maintenance as required (See Maintenance).
7. **Personal Safety:**
   a. Wear safety glasses at all times when working with pumps.
   b. Keep work area clean, uncluttered and properly lighted - replace all unused tools and equipment.
   c. Keep visitors at a safe distance from work area.
   d. Make the workshop childproof use padlocks, master switches and remove starter keys.
8. Do not pump chemicals or corrosive liquids. Pumping these liquids shortens the life of the pumps seals and moving parts and will void the warranty.
9. When installing pump, cover the well to prevent foreign matter from falling into well and contaminating the water and damaging internal mechanical pumping components.
10. Always test the water from the well for purity before use. Check with local health department for test procedure.
11. Complete pump and piping system MUST be protected against below freezing temperature. Freezing temperatures could cause severe damage and void the warranty.
12. Do not run the pump dry or damage will occur and will void warranty.

**⚠WARNING** ***Risk of electrical shock. This pump is designed for indoor installation only.***

**⚠WARNING** ***All wiring should be performed by a licensed or certified electrician.***

13. For maximum safety, the unit should be connected to a grounded circuit equipped with a ground fault interrupter device.
14. Before installing the pump, have the electrical outlet checked by a licensed or certified electrician to make sure the outlet is properly grounded.
15. Make sure the line voltage and frequency of electrical current supply agrees with the motor wiring.
16. Do not attempt repairs to the electric motor. All repairs to the motor must be completed at a licensed or certified electrical motor repair shop.

© 2000 Wayne Home Equipment

## General Safety Information (Cont'd)

**⚠WARNING** ***Do not touch an operating motor. Modern motors are designed to operate at high temperatures.***

17. Avoid kinking electrical cord and protect from sharp objects, hot surfaces, oil and chemicals. Replace or repair damaged or worn cords immediately.

**⚠WARNING** ***Disconnect power and release all pressure from the system before attempting to install, service, relocate or perform any maintenance. Lock the power disconnect in the open position. Tag the power disconnect to prevent unexpected application of power.***

18. Keep fingers and foreign objects away from ventilation and other openings. Do not insert any objects into the motor.

**⚠WARNING** ***Risk of electric shock! Never connect the green (or green and yellow wire) to a live terminal!***

19. To reduce the risk of electrical shock, the pump should be plugged directly into a properly installed and grounded 3-prong grounding type receptacle, as shown in Figure 1. The green (or green and yellow) conductor in the cord is the grounding wire. The motor must be securely and adequately grounded for protection against shock.

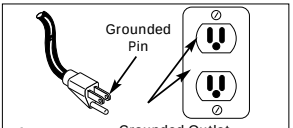


**Figure 1**

20. Where a 2-prong is encountered, replace the plug with a properly grounded 3-prong receptacle in accordance with the National Electrical Code, local codes and ordinances. To ensure a proper ground, the grounding means must be tested by a licensed or certified electrician.
21. Use only 3-wire extension cords that have a 3-prong, grounding type plug, and 3-pole receptacles that accept the equipment plug.
22. Use wire of adequate size to minimize voltage drop at the motor.

**⚠DANGER** ***Do not handle pump or pump motor with wet hands, when standing on a wet or damp surface or when standing in water. Fatal electrical shock could occur.***

**⚠WARNING** ***Pump motor is equipped with an automatic resetting thermal protector and may restart unexpectedly. Protector tripping is an indication of motor overloading because of operating pump at low heads (low discharge restriction), excessively high or low voltage, inadequate wiring, incorrect motor connections or defective motor or pump.***

## Pre-Installation

### WATER SUPPLIES

The water supplies illustrated in Figure 12 are possible sources for water. These water supplies can be divided into two categories:

SURFACE WATER

Water from a lake, stream, pond and cistern. This water is usually not fit for human consumption, but may be suitable for washing, irrigation or other household uses.

GROUND WATER

Water found in the water bearing stratum at various levels beneath the earth. Of all the fresh water found on earth only 3 percent is found on the surface and 97 percent is underground.

### TANKS - CONVENTIONAL STORAGE

The function of the tank is to store a quantity of water under pressure. When full, the tank contains approximately 2/3 water and 1/3 compressed air. The compressed air forces the water out of the tank when a faucet is opened. An air volume control automatically replaces air lost or absorbed into the water. The usable water, or drawdown capacity, of the tank is approximately 1/6 of the tanks total volume when operated on a "20-40" pressure setting (Figure 2).

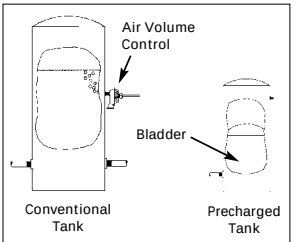


**Figure 2 - Conventional & Precharged Storage Tanks**

### TANKS - PRECHARGED STORAGE

A precharged storage tank has a flexible bladder or diaphragm that acts as a barrier between the compressed air and water. This barrier prevents the air from being absorbed into the water and allows the water to be acted on by compressed air at initially higher than atmospheric pressures (precharged). More usable water is provided than with a conventional type tank. Precharged tanks are specified in terms of a conventional tank. For example, a 20 gallon precharged tank will have the same usable water or drawdown capacity as a 40 gallon conventional tank, but the tank is smaller in size (Figure 2).

### PRESSURE SWITCH

The pressure switch provides for automatic operation. The pump starts when pressure drops to a cut-in setting. The pump stops when pressure reaches a cut-out setting.

**CHART 1 - JET PUMP/TANK ASSEMBLIES**

| | Type | Air Volume Control Required |
|---|---|---|
| Well X | Precharged | No |
| PCA | Precharged | No |
| 12P & 30P Horizontal | Conventional | Yes |
| FX Horizontal | Precharged | No |

# Pre-Installation (Cont'd)

### PACKAGE SYSTEMS

There are four jet pump/tank assemblies sold as packages (Chart 1).

### WELLS

A new well should be pumped clear of sand before installing the pump. Sand will damage the pumping parts and seal. The drawdown level of the well should not exceed the maximum rated depth for the pump. The capacity of the pump will be reduced and a loss of prime may occur.

# Installation

### LOCATION

Select a location as close to the water supply as possible. Be sure to comply with any state or local codes regarding the placement of the pump. The equipment must be protected from the elements. A basement, frost proof pit or heated pump house are good locations. Make sure the pump has proper ventilation. The temperature surrounding the pump is not to exceed 100° F (40°C) or nuisance tripping of the motor overload may occur.

### PIPING

Piping may be copper, steel, rigid PVC plastic or flexible polyethylene plastic.

**⚠CAUTION** ***Flexible pipe is not recommended on suction pipe (inlet pipe).***

The pipe must be clean and free of rust or scale. Use a pipe joint compound on the male threads of the metal pipe. Teflon® tape should be used with plastic threads. All connections must be air tight to insure normal operation.

Slope all inlet piping upwards towards the pump to prevent trapping air.

Unions or hose couplings can be installed near pump to facilitate removal for servicing or storage. A rubber hose installed between the water system and the house piping will reduce the noise transmitted to the house.

### PIPE SIZES

Long horizontal pipe runs and an abundance of fittings and couplers decrease water pressure due to friction loss. See Chart 2 to determine the proper pipe size.

### SHALLOW WELL INSTALLATION

A shallow well pump can be used when the pump is located within 25 feet vertically of the water level. Shallow well pumps have only one pipe between the pump and the water supply (Figure 3).

DRILLED WELL (FIGURE 12)

1. Install a foot valve on the first section of pipe (Figure 3, Illustration A).
2. Lower the pipe into the well.
3. Add pipe until the foot valve is 5 feet below the lowest anticipated water level.

**⚠CAUTION** ***The foot valve should be at least 18" from the bottom of the well or sand or sediment could be drawn into the system.***

4. After proper depth is reached, install a well seal or pitless adapter to support pipe and prevent surface water and other contaminants from entering well.
5. Slope the horizontal pipe upward toward the pump to eliminate trapping air. Sloping the pipe will also aid in priming the pump.

DRIVEN WELL (FIGURE 12)

1. Drive the point several feet below the water table.

**NOTE:** A packer type foot valve can be installed in the well (Figure 3, Illustration B). This type of foot valve allows

**CHART 2 - PIPE SIZING**

| Pump Model | Pump Opening | Horizontal Distance (Feet) 0-25 | 26-100 | 100-300 |
|---|---|---|---|---|
| Shallow Well | Inlet | $1\frac{1}{4}$" | $1\frac{1}{2}$" | 2" |
| | Outlet | 3/4" | 1" | $1\frac{1}{4}$" |

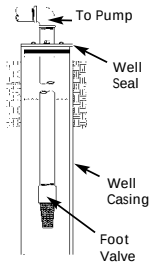


**Illustration A**

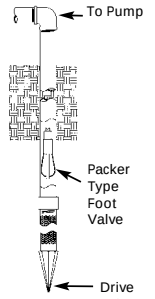


**Illustration B**

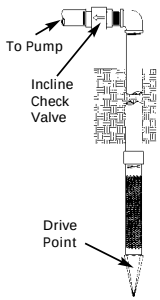


**Illustration C**

**Figure 3**

## Installation (Cont'd)

the well to be filled with water when priming and makes the inlet pipe much easier to test for leaks. Follow the manufacturer's instructions when installing the packer type foot valve.

As an alternative, an in-line check valve can be used with a driven well (Figure 3, Illustration C). The pipe between the check valve and the water level will always be under a vacuum.

Leaking joints or couplings will allow air to leak into the pipe and cause abnormal pump operation. Make sure to use pipe joint compound on all male pipe threads.

DUG WELL, CISTERN, LAKE AND SPRING INSTALLATION (FIGURE 12)

1. Install a foot valve on inlet pipe and lower into water.

**⚠CAUTION** ***The foot valve should be at least 18" from the bottom of the well or sand or sediment could be drawn into the system.***

**NOTE:** When a lake is used as a water supply, make sure the inlet pipe is deep enough to be submerged at all times. Slope the horizontal piping upward toward the pump to prevent trapping air. The pipe must be removed during winter months or protected against freezing.

Protect the pipe from damage from swimmers and boats.

**⚠WARNING** ***Install a screen around the inlet pipe to prevent the entrapment of swimmers.***

**SHALLOW WELL PUMP WITH CONVENTIONAL STORAGE TANK (FIGURES 4 & 5)**

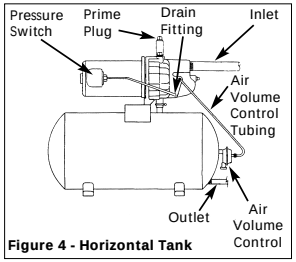


**Figure 4 - Horizontal Tank**

1. Install air volume control on tank.
2. Connect the copper tube from the air volume control to the uppermost 1/8" NPT opening on the side of pump. Be sure the connections are tight. Leaking can cause the pump not to prime.
3. Install a valve and an isolator hose between the tank and the house plumbing to aid in pump removal for servicing and for reducing the noise transmitted to the house thrugh the piping.
4. Provide a hose bib (faucet) at the lowest point in the system to drain the system for service or storage.

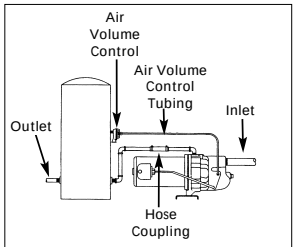


**Figure 5 - Vertical Tank**

**SHALLOW WELL PUMP WITH PRECHARGED STORAGE TANK (FIGURE 6)**

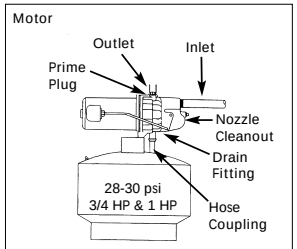


**Figure 6 - Precharged Storage Tank**

1. Shut off the power to the pump.
2. Open the faucet nearest the tank and allow all water to drain from the tank.
3. Measure the tank precharge at the valve stem using a tire pressure gauge.
4. If necessary, precharge with an air pump to 28 - 30 psi on 1/2, 3/4 and 1 HP pumps.
5. Slope the horizontal pipes upward toward the pump to prevent trapping air. If the horizontal distance exceeds 25 feet, see Chart 2 for the recommended pipe size.

## Electrical

**⚠WARNING** ***Risk of electrical shock. This pump is designed for indoor installation only.***

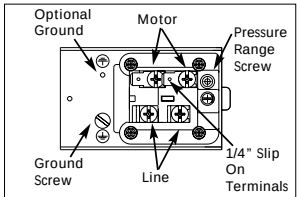


**Figure 7a - Electrical Connections**

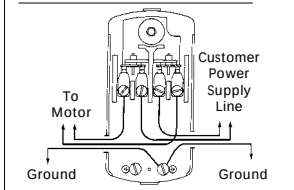


**Figure 7b - Electrical Connections**

Select the proper size wire and fuse (Chart 3). Time delay fuses are recommended over standard fuses for motor circuit protection. All pump motors have built-in automatic overload protection that will prevent damage to the motor due to overheating.

**⚠WARNING** ***Do not connect to electric power supply until unit is permanently grounded. Connect ground wire to approved ground then connect terminal provided.***

A metal underground water pipe or well casing at least 10 feet long makes the best ground electrode. If plastic pipe or insulated fittings are used, run a wire directly to the metal well casing or use a ground electrode furnished by the power company.

There is only one proper ground terminal on the unit. The terminal(s) is located under the pressure switch cover, is painted green and is identified as GRD. The ground connection must be made at this terminal (Figure 7a or





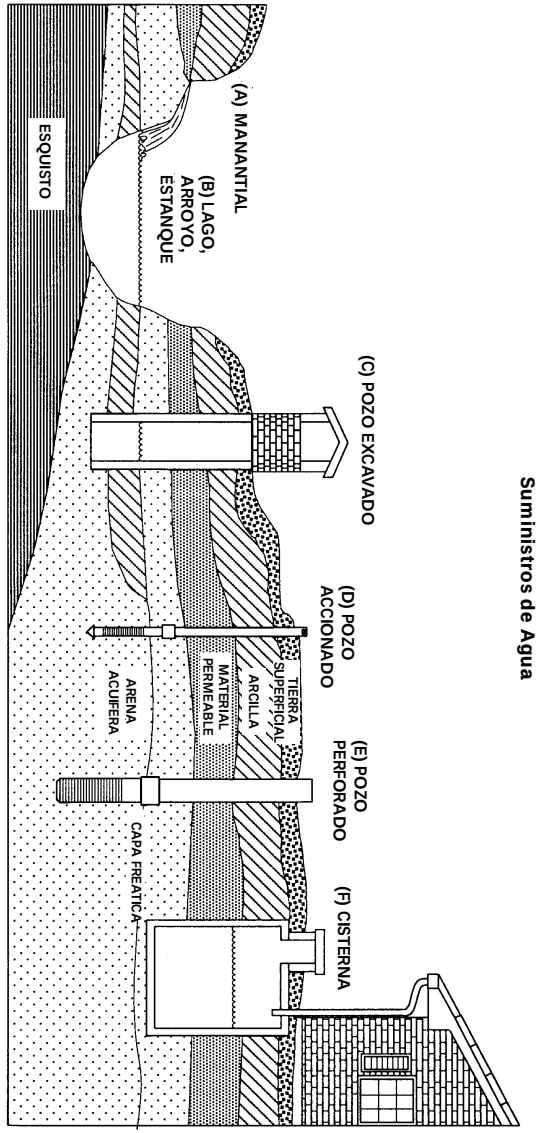


**Figura 12 - Suministros de Agua**

**(A) MANANTIAL:** Un manantial que emerge de la tierra. Ocurre cuando el agua en materiales permeables está atrapada entre materiales impermeables tales como roca o arcilla.

**(B) LAGO, ARROYO o ESTANQUE:** Agua superficial, que a menos que sea tratada, por lo general no es apta para consumo humano. Puede ser utilizada para fines tales como lavado o irrigación.

**(C) POZO EXCAVADO:** Se excava un hoyo de varios pies de diámetro hasta una profundidad basante superficial. Luego se reviste con ladrillo, piedra o concreto para evitar que se derrumbe.

**(D) POZO ACCIONADO:** Se acciona una tubería con una pantalla con punta en la tierra, por debajo de la capa freática. La profundidad por lo general es menor a 15,25 m (50 pies). Los diámetros comunes son 5,1 cm (2"), 7,6 cm (3"), 10,2 cm (4") y 15,2 cm (6") para pozos de agua de uso doméstico.

**(E) POZO PERFORADO:** Un hoyo perforado en la tierra con maquinaria y revestido con tuberías. Las profundidades fluctúan entre algunos pies hasta más de 305 m (1000 pies). Los diámetros comunes son 5,1 cm (2"), 7,6 cm (3"), 10,2 cm (4") y 15,2 cm (6") para pozos de agua de uso doméstico.

**(F) CISTERNA:** Un tanque subterráneo construido para recolectar agua de lluvias de los techos. El agua no es apta para consumo humano.

## Electrical (Cont'd)

7b). The ground conductor must not be smaller than the circuit conductors supplying the motor.

**⚠WARNING** ***Disconnect power and release all pressure from the system before attempting to install, service, relocate or perform any maintenance.***

## Operation

### PRIMING THE SHALLOW WELL PUMP

**⚠WARNING** ***To prevent damage to the pump, do not start motor until pump has been filled with water.***

1. Remove prime plug (Figure 4 or 5).
2. Fill pump and piping completely full of water.
3. Replace the prime plug.
4. Open a faucet to vent the system.
5. Start the motor. Water will pump in a few minutes. If pump fails to prime in 5 minutes, stop motor and refill pump with water. Priming time is proportional to the amount of air in inlet pipe.
6. Let the system operate for several minutes to flush all pipes.
7. Close faucet and allow pump to build pressure in tank. When the pressure reaches the cut-out setting, the motor will stop.

The system is now in operation and will automatically cycle on demand.

## Maintenance

**⚠WARNING** ***Disconnect power and release all pressure from the system before attempting to install, service, relocate or perform any maintenance. Lock the power disconnect in the open position. Tag the power disconnect to prevent unexpected application of power.***

**⚠CAUTION** ***Protect the pump from freezing during winter conditions.***

### DRAINING THE PUMP

Drain openings are provided on all models. To drain the pump:

1. Remove drain plug and prime plug to vent the system.
2. Drain all piping to a point below the freeze line.

### DRAINING THE TANK

Conventional tanks can be drained by opening an outlet at the lowest point in the system. Remove plug or the air volume control to vent the tank.

Precharged tanks force virtually all the water from the tank when system pressure is released. No draining is necessary.

### RESTARTING PUMP

If the pump has been serviced, drained or has not been used for some time, be sure there is water in the pump housing (volute) and the piping to the well. There must be water in the pump housing (volute) at all times when the pump is running to avoid internal damage of seal members (Priming the Shallow Well).

### WATERLOGGED TANKS: CONVENTIONAL

When a tank system has an inadequate ratio of air and water, the pump will start and stop often and eradically.

1. Disconnect the power to the pump.
2. Open the lowest faucet in the system to release all pressurized water in the system.
3. Prime the pump (Priming the Shallow Well).
4. Reconnect the power to the pump.

**NOTE:** As the pump refills the tank with water, the air volume control supplies the tank with the correct air to water ratio for the system to operate. If the air volume control is good, the pump will shut off at the desired cut-off and will be adjusted correctly.

### WATERLOGGED TANKS: PRECHARGED

If a precharged tank becomes waterlogged, the bladder is normally leaking or broken.

1. Test the tank by depressing the air valve. The air valve will expel water if the bladder is broken.
2. Replace the tank.

**NOTE:** Once a bladder is leaking or broken, the bladder cannot be repaired. The tank must be replaced.

### LUBRICATION

The bearings used in the pumps are lifetime lubricated at the factory and require no additional lubrication.

### PRECHARGED TANK

Some air is lost through the bladder in any tank. To prevent tank failure, check the tank precharge on a yearly basis.

1. Open a faucet nearest the tank and allow all water to drain from the tank.
2. Measure the tank precharge at the valve stem using a tire gauge.
3. If necessary, adjust the precharge with an air pump 28 - 50 psi on 1/2, 3/4 and 1 HP pumps.

### REMOVING OLD SHAFT SEAL

**⚠CAUTION** ***Turn disconnect switch to "off" position.***

1. Open a faucet nearest the tank and allow all water to drain from the tank.

**CHART 3 - RECOMMENDED FUSE & WIRING DATA - 60 HZ MOTORS**

| | | | Distance In Feet From Meter To Motor | | | |
|---|---|---|---|---|---|---|
| | | Dual Element Fuse | 0 To 50 | 51 To 100 | 101 To 200 | 201 To 300 |
| HP | Volt | 250V | Wire Size | | | |
| 1/2 | 115 | 15 | 14 | 14 | 12 | 10 |
| | 230 | 10 | 14 | 14 | 14 | 14 |
| 3/4 | 115 | 15 | 14 | 14 | 10 | 8 |
| | 230 | 10 | 14 | 14 | 14 | 14 |
| 1 | 115 | 20 | 12 | 12 | 10 | 8 |
| | 230 | 10 | 14 | 14 | 14 | 14 |